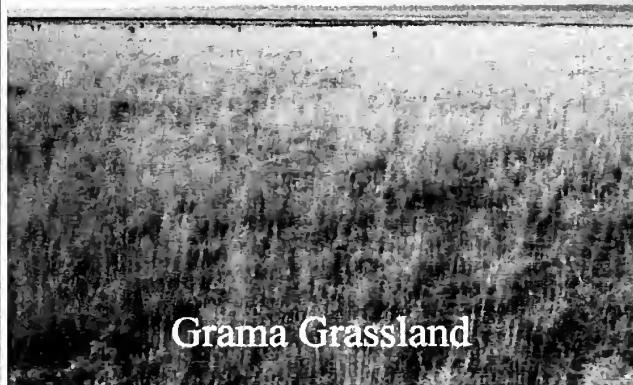


OCCASIONAL PAPERS

Museum of Texas Tech University

Number 192

15 July 1999



Grama Grassland



Swale



Sandy Arroyo Scrub



Nonstabilized Sand Dune

CHECKLIST OF MAMMALS
FROM TWELVE HABITAT TYPES
AT FORT BLISS MILITARY BASE;
1997-1998

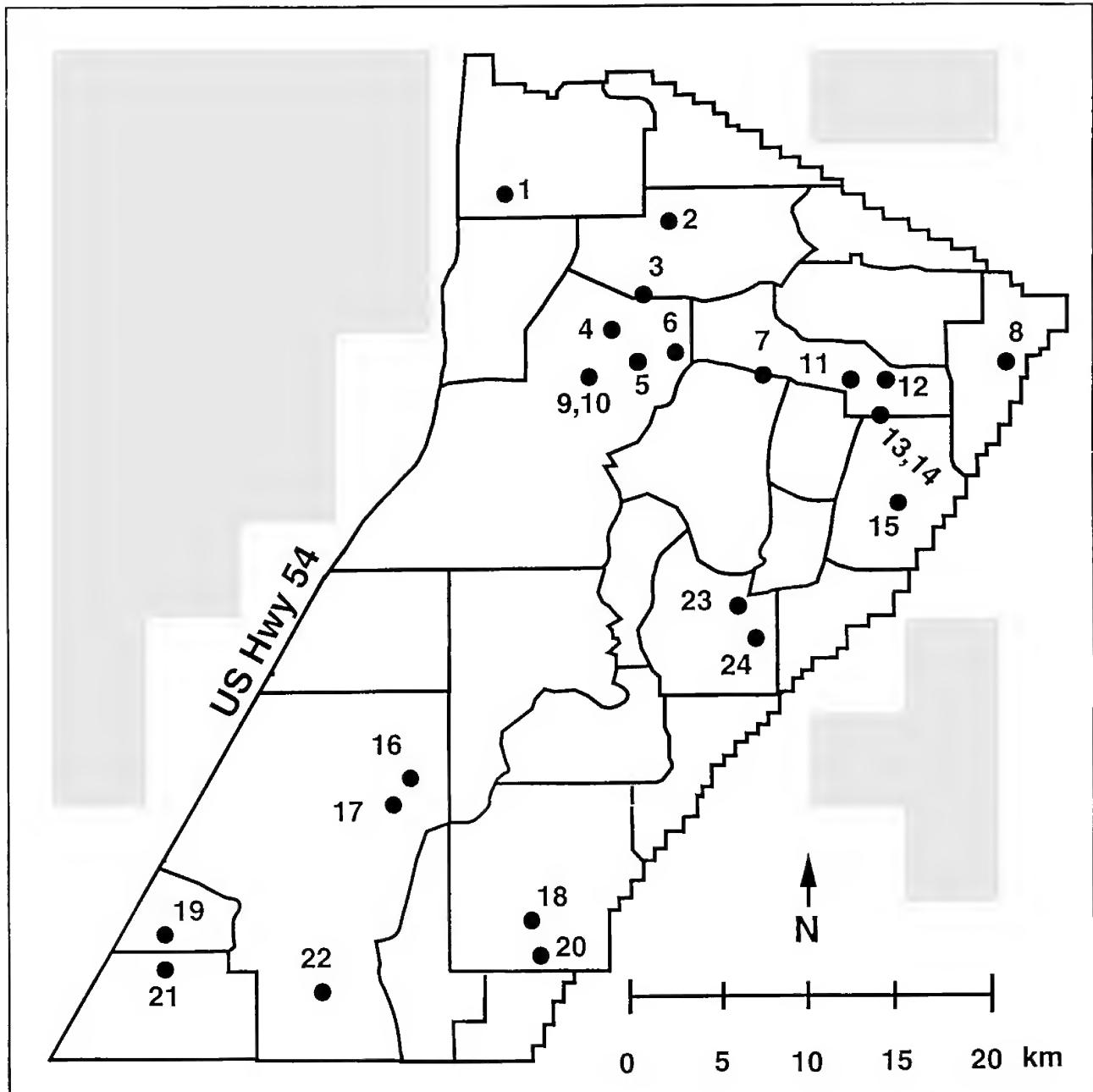


Figure 1.— Map of McGregor Range, Fort Bliss Military Base depicting the locations of trapping census lines (closed circles) utilized in this study. Numbers refer to census lines 1-24, which are described in Table 1. Census lines 9 and 10 were located in close proximity of each other and are identified by a single closed circle; the same is true for census lines 13 and 14.

Front cover: Four of the twelve distinct habitats (swale, sandy arroyo scrub, grama grassland, and nonstabilized sand dune) identified on the Fort Bliss Military Base. Small mammal surveys were conducted in replicates of these and the remaining eight habitats from May 1997 to October 1998.

CHECKLIST OF MAMMALS FROM TWELVE HABITAT TYPES AT FORT BLISS MILITARY BASE; 1997-1998

MELINDA L. CLARY, DARIN M. BELL, CODY W. EDWARDS, TED W. JOLLEY,
OLEKSIY KNYAZHNITSKIY, NICOLE LEWIS-ORITT, STACY J. MANTOOCH,
LOTTIE L. PEPPERS, IRENE TIEMANN-BOEGE, FRANK D. YANCEY, II,
DONNA J. HOWELL, BRIAN A. LOCKE, ROBERT J. BAKER,
AND ROBERT D. BRADLEY

The Fort Bliss Military Base is located in Dona Aña and Otero counties, New Mexico, and El Paso County, Texas. This army base occupies approximately 4,523 km² (452,279 ha) and is bordered by the Sacramento Mountains to the north, the Organ Mountains to the west, and the Franklin Mountains to the southwest. Fort Bliss Military Base is bisected by U.S. Highway 54, resulting in the Dona Aña Range to the west and the McGregor Range to the east. This region, located within the northern area of the Chihuahuan Desert (Shreve, 1942), is characterized by a semiarid to arid climate and is often classified as a desert grassland (Gardner, 1951; Schmidt, 1986). Geographically, Fort Bliss is located within the Tularosa Basin and is typified by lowland valleys, rocky hillsides, and scat-

tered arroyos (Jorgensen, 1996; Monasmith, 1997). Two unusual physiographic features found in this region include coppice sand dunes and Otero Mesa.

A small mammal survey was conducted using census lines as described in O'Farrell (1977) in 12 distinct habitat types on McGregor Range in May 1997, September-October 1997, May 1998, and September-October 1998. This study was designed to collect baseline data concerning small mammal diversity and habitat preference. This paper is an accounting of species trapped. Analyses and discussion of diversity, seasonal change, and movements will be addressed in subsequent articles.

METHODS AND MATERIALS

The research design for this study involved sampling small mammals (rodents) in 12 distinct habitat types with two replicates (census lines) per habitat. Brief descriptions of the 12 habitat types are provided in Table 1. This includes the locality of each census line given in Universal Transverse Mercator (UTM) coordinates and a list of the dominant plant species associated with each census line. Habitat selection was done in conjunction with ongoing floral studies by other Fort Bliss personnel and attempts were made to utilize the same or nearby areas for both the floral and small mammal studies (Fig. 1). At each census line, two parallel trap lines 30 m apart (240 m in length) were established with trap stations placed at 10 m intervals along each line resulting in a total of 50 traps. Each census line was sampled using Sherman

(H.B. Sherman Trap Co., Tallahassee, FL) live-traps baited with bird seed and rolled oats during two seasonal periods (spring and autumn) for two consecutive years (1997 and 1998). Sampling of the census lines usually occurred on three consecutive nights during each trapping period, resulting in 14,400 trap nights. Occasionally, due to full moon phases, weather, and military operations and schedules, it was not possible to sample particular census lines on the three consecutive nights. Therefore, we were forced to postpone consecutive night sampling for periods of one to four days. Individuals captured on census lines were identified, weighed, sexed, toe-clipped (Animal Care and Use Committee, 1998), assigned a TK number (Museum of Texas Tech University identification number), and released at the site of capture. For simplic-

ity, references to all individuals reported herein are by season and year rather than by the actual date of capture; likewise, census lines are used for localities rather than the actual UTM coordinates. These data are provided in Tables 2-6.

A reference collection of voucher specimens and tissue samples for at least one adult male and one adult female, representative of each species, was prepared and deposited in the Museum of Texas Tech University. In addition, toes obtained during the toe-clipping procedures were preserved in lysis buffer (Longmire et al., 1997) and serve as voucher material for specimens obtained during this study. Nomenclature followed Jones et al. (1997) and specimens were identified using keys and characteristics from Davis and Schmidly (1994), Findley (1987), and Findley et al. (1975). Additionally, a few species were observed but not trapped on the Fort Bliss Military Base. These observations are listed in a separate section (Species Observed in the Results and Discussion).

RESULTS AND DISCUSSION

A description of the 12 habitats and 24 census lines, including UTM coordinates and dominant plant species, is presented in Table 1. During the two years of this study (1997 and 1998), 2,099 individuals representing 19 species of small mammals were obtained from the 24 census lines (Tables 2-6). In the initial year (1997), the greatest diversity and relative abundance of the 19 species was observed. The two trapping seasons in 1997 accounted for 72.4% of the individuals (1,520) captured. Most species (17 of 19) declined in relative abundance from 1997 to 1998 with 579 (28% of the total) individuals captured in 1998. However there were two exceptions, *Neotoma albigena* and *Neotoma micropus*, which increased in relative abundance during 1998. Of the four trapping periods (spring 1997, autumn 1997, spring 1998, and autumn 1998), efforts during spring 1997 resulted in the most diversity (19 species) and abundance (44% of the total). The spring and autumn 1998 trapping seasons resulted in the lowest number of captures with only 289 individuals representing 18 species in the spring and 290 individuals representing 15 species in the autumn.

Table 1.— Description of the 12 habitats sampled in this study. The locality for each habitat replicate (census line) and UTM coordinates are provided. The dominant plant species associated with each habitat type also are provided.

HABITAT TYPE	LOCALITY	DOMINANT PLANT SPECIES
Nonstabilized dune	(Census line 1) UTM: 13-408919E-3608741N (Census line 2) UTM: 13-419633E-3606374N	<i>Polygonum incana</i> , rosemary mint <i>Quercus havardiana</i> , dwarf oak <i>Prosopis glandulosa</i> , mesquite <i>Aristida filifolia</i> , sand sage <i>Atriplex canescens</i> , four-wing saltbush
Sandy arroyo scrub	(Census line 3) UTM: 13-418467E-3599709N (Census line 6) UTM: 13-423362E-3595787N	<i>Fallugia paradoxa</i> , apache-plume <i>Chilopsis linearis</i> , desert willow <i>Baccharis pteronioides</i> , baccharis <i>Brickellia</i> sp., brickellbush
Mixed desert scrub	(Census line 4) UTM: 13-416933E-3598822N (Census line 22) UTM: 13-396433E-3545883N	<i>Larrea tridentata</i> , creosotebush <i>Acacia neovernicosa</i> , acacia <i>Yucca</i> sp., yucca <i>Prosopis glandulosa</i> , mesquite <i>Lycium berlandieri</i> , silver desert thorn

Swale	(Census line 5) UTM: 13-416547E-3596892N (Census line 10) UTM: 13-415687E-3593824N	<i>Sporobolus airoides</i> , alakali sacaton <i>Hilaria mutica</i> , tobosa <i>Acacia neovernicosa</i> , acacia <i>Opuntia sp.</i> , cactus
Succulent hillside	(Census line 7) UTM: 13-422650E-3595237N (Census line 20) UTM: 13-410133E-3550111N	<i>Yucca sp.</i> , yucca <i>Nolina sp.</i> , sacahuista <i>Dasylinion wheeleri</i> , sotol
<i>Chilopsis</i> arroyo	(Census line 8) UTM: 13-445098E-3594840N (Census line 13) UTM: 13-435821E-3591433N	<i>Chilopsis linearis</i> , desert willow <i>Celtis sp.</i> , hackberry <i>Fraxinus sp.</i> , ash
Acacia hillside	(Census line 9) UTM: 13-415648E-3593986N (Census line 16) UTM: 13-402344E-3563521N	<i>Acacia neovernicosa</i> , acacia <i>Opuntia sp.</i> , cactus
Grama grassland	(Census line 11) UTM: 13-429746E-3593710N (Census line 15) UTM: 13-436716E-3583184N	<i>Muhlenbergia sp.</i> , bullgrass <i>Aristida sp.</i> , threeawn <i>Stipa sp.</i> , needlegrass
Creosote-tarbrush scrub	(Census line 12) UTM: 13-434087E-3592888N (Census line 18) UTM: 13-409963E-3551447N	<i>Larrea tridentata</i> , creosote-bush <i>Yucca sp.</i> , yucca <i>Opuntia sp.</i> , cactus
Coppice dune	(Census line 14) UTM: 13-435668E-35911196N (Census line 17) UTM: 13-400815E-3562826N	<i>Larrea tridentata</i> , creosote-bush <i>Flourensia cernua</i> , American tarwort <i>Kreameria erecta</i> , small-flower ratany <i>Dalea sp.</i> , prairieclover <i>Lycium berlandieri</i> , silver desert-thorn <i>Opuntia sp.</i> , cactus
Yucca grassland	(Census line 19) UTM: 13-384950E-35511303N (Census line 21) UTM: 13-384278E-3549234N	<i>Prosopis glandulosa</i> , mesquite <i>Larrea tridentata</i> , creosote-bush <i>Yucca sp.</i> , yucca <i>Atriplex canescens</i> , four-wing saltbush
	(Census line 23) UTM: 13-428099E-3574921N (Census line 24) UTM: 13-426500E-3575436N	<i>Yucca sp.</i> , yucca <i>Aristida sp.</i> , threeawn <i>Bouteloua gracilis</i> , blue grama <i>Muhlenbergia sp.</i> , muhly

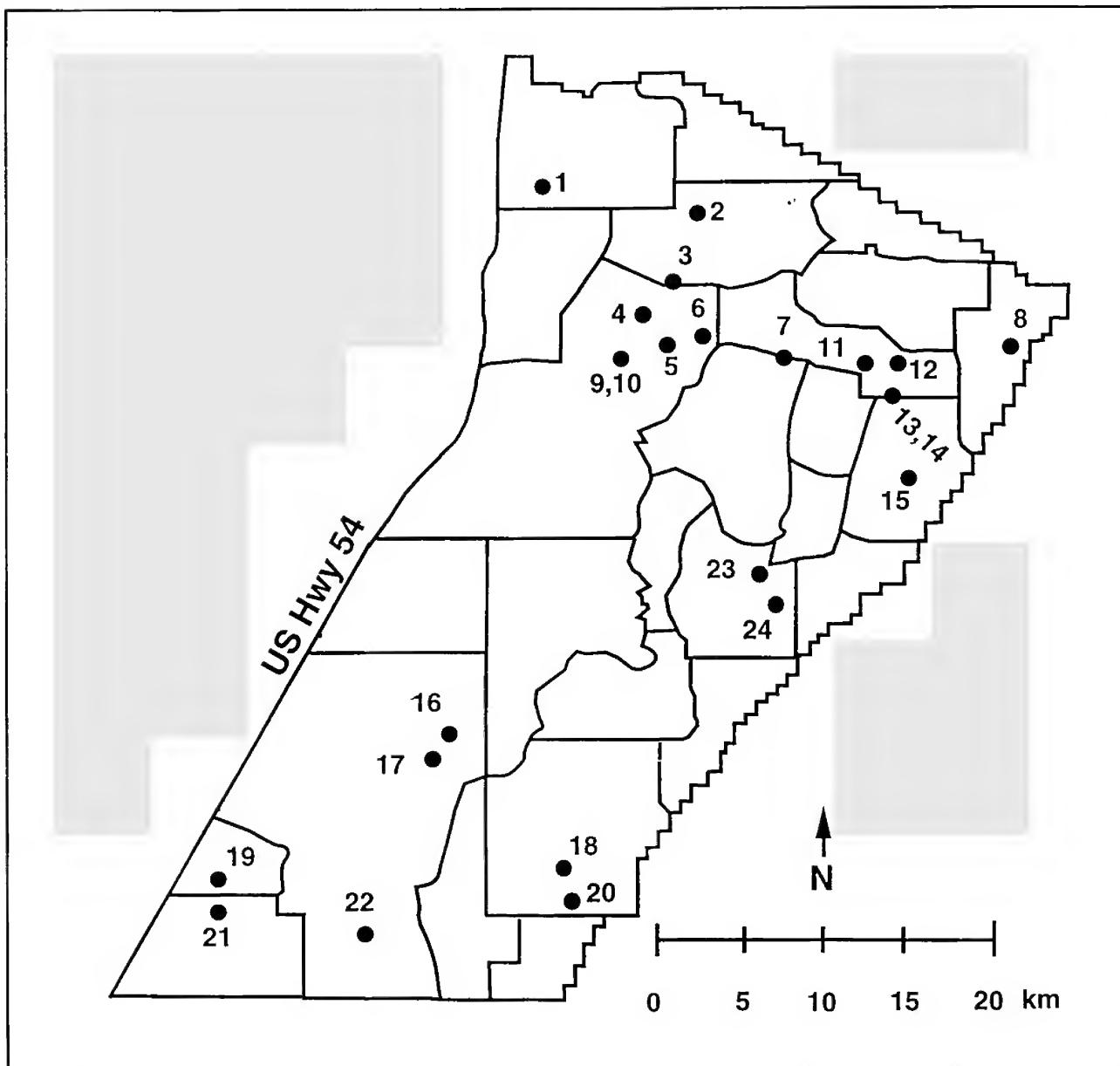


Figure 1.— Map of McGregor Range, Fort Bliss Military Base depicting the locations of trapping census lines (closed circles) utilized in this study. Numbers refer to census lines 1-24, which are described in Table 1. Census lines 9 and 10 were located in close proximity of each other and are identified by a single closed circle; the same was true for census lines 13 and 14.

During the two year study, the *Chilopsis* arroyo habitats (census lines 13 and 8) accounted for the greatest small mammal diversity with 14 of 19 species. Likewise, one of the swale sites (census line 10) possessed the highest number of captures (148 indi-

viduals) for any individual census line. Trapping efforts from 1997-1998 on one of the coppice dune sites (census line 21) resulted in the lowest species diversity (5 of the 19 species) and the least number of captures (16 individuals).

Table 2.—Species diversity and number of males (M) and females (F) obtained from each census line (CL) sampled in the spring, 1997.

Species	CL 1	CL 2	CL 3	CL 4	CL 5	CL 6	CL 7	CL 8	CL 9	CL 10	CL 11	CL 12
	M/F											
<i>Spermophilus spilosoma</i>	—	—	—	—	—	—	—	—	—	—	—	1/0
<i>Perognathus flavescens</i>	—	—	1/0	—	—	—	—	—	—	—	—	—
<i>Perognathus flavus</i>	—	—	1/0	3/1	1/1	—	1/0	1/5	2/1	8/3	8/6	6/2
<i>Chaetodipus eremicus</i>	—	1/0	0/1	6/0	—	3/2	—	—	9/3	2/0	—	—
<i>Chaetodipus hispidus</i>	—	—	—	—	—	—	—	—	—	—	—	2/0
<i>Chaetodipus intermedius</i>	—	0/1	0/3	0/1	—	4/4	10/11	—	1/6	—	—	—
<i>Dipodomys merriami</i>	—	—	4/5	12/8	2/0	0/1	—	3/5	6/4	2/1	—	2/1
<i>Dipodomys ordii</i>	16/7	8/10	1/0	—	—	—	—	1/1	—	1/0	—	1/0
<i>Dipodomys spectabilis</i>	—	—	—	—	—	—	—	—	—	—	—	0/1
<i>Reithrodontomys megalotis</i>	—	—	0/1	—	12/8	—	—	1/0	—	7/7	—	2/0
<i>Reithrodontomys montanus</i>	—	—	—	—	2/0	—	—	5/5	—	0/1	—	—
<i>Peromyscus eremicus</i>	1/1	0/1	6/1	4/3	—	1/1	5/5	—	5/2	—	—	—
<i>Peromyscus leucopus</i>	1/0	—	1/0	—	7/9	3/0	3/0	1/0	1/1	4/2	—	6/3
<i>Peromyscus maniculatus</i>	0/1	—	3/2	5/7	8/4	2/2	3/0	1/0	8/8	0/1	—	3/1
<i>Onychomys arenicola</i>	—	—	—	—	—	—	—	1/1	0/1	0/2	2/1	2/2
<i>Onychomys leucogaster</i>	4/3	1/1	—	0/2	—	1/0	2/1	1/0	—	1/1	0/1	—
<i>Sigmodon hispidus</i>	—	—	—	—	13/11	—	—	1/0	0/1	17/16	—	1/0
<i>Neotoma albigenula</i>	2/2	—	1/1	—	—	3/7	1/0	0/1	—	—	—	—
<i>Neotoma micropus</i>	—	—	—	0/1	—	2/1	—	1/0	—	—	0/1	—
TOTAL	24/14	10/13	18/14	30/23	45/33	19/18	25/17	17/18	32/27	41/33	11/8	26/12

Species	CL 13	CL 14	CL 15	CL 16	CL 17	CL 18	CL 19	CL 20	CL 21	CL 22	CL 23	CL 24	TOTAL
	M/F	M/F											
<i>Spermophilus spilosoma</i>	—	—	0/1	—	—	—	—	—	—	—	—	—	—
<i>Perognathus flavescens</i>	—	—	—	—	—	—	—	—	—	—	—	—	1/1
<i>Perognathus flavus</i>	1/1	10/1	9/7	—	5/1	12/18	—	6/13	—	2/3	12/13	11/9	1/0
<i>Chaetodipus eremicus</i>	—	—	—	—	—	—	—	2/0	—	2/1	—	—	25/7
<i>Chaetodipus hispidus</i>	—	—	0/2	—	—	—	—	—	—	—	3/2	1/1	6/5
<i>Chaetodipus intermedius</i>	2/1	—	—	7/10	—	—	3/1	—	—	—	—	—	27/38
<i>Dipodomys merriami</i>	7/5	6/6	—	4/2	3/4	6/5	6/1	2/3	3/1	6/7	—	—	74/59
<i>Dipodomys ordii</i>	—	—	—	—	—	2/0	1/1	—	0/1	—	—	1/2	32/23
<i>Dipodomys spectabilis</i>	—	—	—	—	—	1/0	—	—	—	—	3/2	1/1	37/25
<i>Reithrodontomys megalotis</i>	6/3	1/0	—	1/0	3/3	—	—	—	—	—	1/1	—	7/6
<i>Reithrodontomys montanus</i>	—	—	—	—	—	—	—	—	—	—	—	—	33/26
<i>Peromyscus eremicus</i>	2/0	—	—	9/11	0/1	—	—	—	—	—	—	—	41/22
<i>Peromyscus leucopus</i>	5/2	—	—	5/2	—	—	—	—	—	2/3	2/0	—	—
<i>Peromyscus maniculatus</i>	2/1	0/2	—	6/5	3/3	—	—	1/0	—	0/1	1/0	—	47/38
<i>Onychomys arenicola</i>	—	2/0	—	0/1	1/0	—	—	—	—	—	—	—	8/8
<i>Onychomys leucogaster</i>	1/0	—	—	—	4/6	—	—	—	—	—	—	1/2	38/36
<i>Sigmodon hispidus</i>	1/1	—	—	4/3	—	—	0/1	1/1	—	—	—	—	13/17
<i>Neotoma albigenula</i>	—	1/2	—	0/1	—	1/0	—	—	—	—	—	—	5/6
<i>Neotoma micropus</i>	—	—	—	—	—	—	—	—	—	—	—	—	—
TOTAL	27/14	20/11	10/10	31/32	23/21	7/3	15/18	3/2	11/11	20/22	18/15	506/412	—

Taxa Documented by Live-Trapping.—The taxa described below are arranged phylogenetically following Davis and Schmidly (1994). Actual numbers of captures per taxon, census line, and season are listed in Tables 2-6.

Spermophilus spilosoma marginatus
Bailey, 1902
Spotted Ground Squirrel

Seven individuals (3 males and 4 females) of *Spermophilus spilosoma* were obtained. In all cases, individuals were obtained either in open grasslands or in open areas associated with dunes. A female was obtained in spring 1997 in a grama grassland (census line 15), two females were obtained in autumn 1997 in a coppice dune and a mixed desert scrub habitat (census lines 21 and 22), and a female was obtained in spring 1998 in a grama grassland (census line 11). A male was obtained in spring 1997 in a creosote grassland (census line 12) and two males were obtained in spring 1998, one each in a nonstabilized dune (census line 1) and grama grassland (census line 11). Individuals of *S. spilosoma* were obtained during every season except autumn 1998. Although this species appears to be relatively rare, it should be noted that the paucity of individuals obtained probably was a result of sampling design (traps not open during diurnal hours) and not indicative of actual abundance.

Perognathus flavescens apache
Merriam, 1889
Plains Pocket Mouse

Perognathus flavescens was the least abundant nocturnal species obtained with seven individuals (5 males and 2 females) captured. This species typically was obtained in habitats with relatively moderate amounts of vegetation. Two females were obtained in autumn 1997, one from an acacia hillside (census line 16) and the other from a mixed desert scrub habitat (census line 22). A male was obtained in spring 1997 in a sandy arroyo scrub habitat (census line 3), two males were obtained in autumn 1997, one each in a sandy arroyo scrub habitat (census line 3) and a succulent hillside habitat (census line 7), and two males were obtained in spring 1998 on a succulent hillside

habitat (census line 7). *P. flavescens* was most abundant during autumn 1997 (57% of total captures of this species) and individuals were obtained every season except autumn 1998.

Perognathus flavus flavus
Baird, 1855
Silky Pocket Mouse

Perognathus flavus was the most abundant species obtained during this study with 388 individuals (215 males and 173 females). This species was captured in all habitats with the exception of one of the nonstabilized dunes (census line 1) and both coppice dunes (census lines 19 and 21), and was most abundant in the grama, yucca, and creosote grasslands. Individuals of *P. flavus* were obtained in all four trapping seasons, but were most common in spring 1997 when 47% of the individuals were captured.

Chaetodipus hispidus paradoxus
Merriam, 1889
Hispid Pocket Mouse

Fifteen individuals of *Chaetodipus hispidus* (9 males and 6 females) were obtained from three grassland habitats. Five females were obtained in spring 1997 from grama (census line 15) and yucca grasslands (census lines 23 and 24), and a female was obtained in autumn 1997 in a yucca grassland (census line 23). Six males were obtained in spring 1997 in creosote (census line 12) and yucca grasslands (census lines 23 and 24), a male was obtained in autumn 1997 in a yucca grassland (census line 23), and two males were obtained in spring 1998 in a creosote grassland (census line 12). Our data indicate that this taxon is restricted to the grama, yucca, and creosote grasslands. Seventy-three percent of the *C. hispidus* individuals were obtained in spring 1997 and no individuals were captured in autumn 1998. This taxon was the fourth least abundant species (along with *Reithrodontomys montanus*) obtained. The low numbers of captures may reflect the fact that the Fort Bliss study site is located at the periphery of the distributional range of *C. hispidus*, where species normally are less abundant.

Table 3.—Species diversity and number of males (M) and females (F) obtained from each census line (CL) sampled in the autumn, 1997.

Chaetodipus intermedius intermedius

Merriam, 1889

Rock Pocket Mouse

One hundred and forty-eight individuals of *Chaetodipus intermedius* (67 males and 81 females) were obtained. This species commonly was found throughout the creosote-tarbrush scrub habitats as well as the acacia and succulent hillside habitats. This species was obtained during all four trapping periods and was most abundant in spring 1997 with 44% of the individuals being captured during this period.

Chaetodipus eremicus

Mearns, 1898

Chihuahuan Desert Pocket Mouse

Eighty-eight individuals of *Chaetodipus eremicus* (59 males and 29 females) were obtained primarily within the mixed desert shrub and acacia hillside habitats. Individuals of *C. eremicus* were obtained every season and were most abundant during spring 1997 when 36% of the total captures was recorded.

Dipodomys merriami ambiguus

Merriam, 1890

Merriam's Kangaroo Rat

Dipodomys merriami was the second most abundant species (349 individuals, 190 males and 159 females). Individuals of this taxon were obtained during all four trapping periods and from all habitat types. Spring 1997 yielded the most individuals with 38% of the total captures of this species. During autumn 1997, spring 1998, and autumn 1998 there was a slight decrease in trap success for *D. merriami*.

Dipodomys ordii ordii

Woodhouse, 1853

Ord's Kangaroo Rat

One hundred and twenty-eight individuals of *Dipodomys ordii* (77 males and 51 females) were obtained primarily within the coppice (census lines 19 and 21) and nonstabilized (census lines 1 and 2) sand

dune sites. This taxon was obtained in all four seasons and was most abundant in spring 1997 (43% of the total captures of this species).

Dipodomys spectabilis baileyi

Goldman, 1923

Banner-tailed Kangaroo Rat

Nine individuals of *Dipodomys spectabilis* (5 males and 4 females) were obtained. A female was obtained in spring 1997 on a creosote grassland (census line 12), two females were obtained in spring 1998 on a grama grassland (census line 15), and a female was obtained in autumn 1998 on a creosote grassland (census line 18). A male was obtained in spring 1997 on a creosote grassland (census line 18), another male was obtained in spring 1998 on a *Chilopsis* arroyo habitat (census line 13), and three males were obtained in autumn 1998 on grama (census line 11) and creosote (census line 12) grasslands and a *Chilopsis* arroyo (census line 13). No individuals were trapped during autumn 1997. Typically, individuals of *Dipodomys spectabilis* were obtained in grassland habitats (creosote and grama), although two individuals were obtained in a *Chilopsis* arroyo habitat. This taxon was the third least abundant species obtained. Although this species appears to be uncommon throughout the study area, numerous mounds and burrow systems were observed outside of the designated census lines. The low number of individuals trapped was probably the result, in part, of the placement of census lines, as well as the trap size being too small to effectively capture this species.

Reithrodontomys megalotis megalotis

(Baird, 1858)

Western Harvest Mouse

One hundred and seventeen individuals of *Reithrodontomys megalotis* (77 males and 40 females) were obtained. Our data indicate this species favors tall, thick grassy habitats. Fifty-three percent of the total captures of this species occurred in spring 1997. Autumn 1997, spring 1998, and autumn 1998 showed a sharp decline in the number of *Reithrodontomys megalotis* captures.

Table 4.—Species diversity and number of males (*M*) and females (*F*) obtained from each census line (*CL*) sampled in the spring, 1998.

Reithrodontomys montanus montanus
(Baird, 1855)
 Plains Harvest Mouse

Fifteen individuals of *Reithrodontomys montanus* (8 male and 7 female) were obtained; primarily from the grassy areas of the dry Sacramento riverbed. Seven males were obtained in swale (census line 5) and *Chilopsis* arroyo (census line 8) habitats and six females were obtained in *Chilopsis* arroyo (census line 8) and swale (census line 10) habitats in spring 1997. Two individuals (1 male and 1 female) were obtained in a yucca grassland (census line 24) in autumn 1997. No individuals of *R. montanus* were captured in 1998. *Reithrodontomys montanus* was the fourth least abundant species (along with *Chaetodipus hispidus*) obtained.

Peromyscus eremicus eremicus
(Baird, 1858)
 Cactus Mouse

One hundred and six individuals of *Peromyscus eremicus* (63 males and 43 females) were obtained throughout most of the brushy hillside areas including the acacia (census lines 9 and 16) and succulent (census lines 7 and 20) hillside habitats. Fifty-six percent of the individuals were captured in spring 1997.

Peromyscus maniculatus blandus
Osgood, 1904
 Deer Mouse

This was the most commonly captured species of *Peromyscus* with 144 individuals (83 males and 61 females) obtained from a wide variety of habitats. These habitats ranged from dune sites to grasslands and rocky hillsides. This taxon was obtained in all four seasons with 59% of the captures for this species occurring in spring 1997.

Peromyscus leucopus tornillo
Mearns, 1896
 White-footed Mouse

One hundred and forty-nine individuals of

Peromyscus leucopus (91 males and 58 females) were obtained in multiple habitats. These ranged from grama grasslands to succulent hillsides with brush and yucca species generally associated with all habitats. This species was obtained during all four trapping periods and was most abundant during the two trapping seasons in 1997, which accounted for 74% of the captures for this species.

Onychomys arenicola arenicola
Mearns, 1896
 Mearn's Grasshopper Mouse

Sixty-one individuals of *Onychomys arenicola* (29 males and 32 females) were obtained from census lines associated with grama and creosote grasslands as well as swales and creosote-tarbrush scrub habitats. This species was obtained during all four seasons and, unlike most other species, was most abundant in the autumn 1997 trapping period, which accounted for 66% of the individuals captured.

Onychomys leucogaster ruidosae
Stone and Rehn, 1903
 Northern Grasshopper Mouse

Eighty individuals of *Onychomys leucogaster* (46 males and 34 females) were captured in census lines associated with dune, grassland, and succulent hillside habitats. This taxon was obtained during all four trapping periods and, like its congener, was most abundant in autumn 1997 when 51% of the captures of this species occurred.

Sigmodon hispidus berlandieri
Baird, 1855
 Hispid Cotton Rat

One hundred and thirty-four individuals of *Sigmodon hispidus* (63 males and 71 females) were obtained primarily in the swale habitats, although a few were captured in the creosote-tarbrush scrub habitats. This species was present during all four trapping seasons, but was captured predominantly during spring 1997 when 55% of the total individuals were obtained.

Table 5.—Species diversity and number of males (M) and females (F) obtained from each census line (CL) sampled in the august, 1998.

Species	CL 1 M/F	CL 2 M/F	CL 3 M/F	CL 4 M/F	CL 5 M/F	CL 6 M/F	CL 7 M/F	CL 8 M/F	CL 9 M/F	CL 10 M/F	CL 11 M/F	CL 12 M/F
<i>Spermophilus spilosoma</i>	—	—	—	—	—	—	—	—	—	—	—	—
<i>Perognathus flavescens</i>	—	—	—	—	—	—	—	—	—	—	—	—
<i>Chaetodipus eremicus</i>	0/1	2/0	—	—	1/1	—	—	—	—	1/0	2/2	0/2
<i>Chaetodipus hispidus</i>	—	0/2	2/1	2/1	—	0/1	0/2	—	—	3/3	0/1	—
<i>Chaetodipus intermedius</i>	1/0	—	—	2/1	—	—	—	—	—	—	—	—
<i>Dipodomys merriami</i>	—	—	1/3	4/1	—	4/7	3/10	—	0/2	—	—	—
<i>Dipodomys ordii</i>	5/1	0/1	—	—	0/2	—	3/3	1/0	0/2	—	—	1/3
<i>Dipodomys spectabilis</i>	—	—	—	—	—	—	—	—	—	—	—	—
<i>Reithrodontomys megalotis</i>	—	—	—	—	—	—	—	—	—	—	1/0	1/0
<i>Reithrodontomys montanus</i>	—	—	—	—	—	—	—	—	—	—	0/1	—
<i>Peromyscus eremicus</i>	—	—	—	2/0	1/0	2/0	0/1	—	—	1/1	—	—
<i>Peromyscus leucopus</i>	—	—	0/2	—	1/1	1/1	2/1	3/0	0/1	1/0	—	2/0
<i>Peromyscus maniculatus</i>	—	—	1/0	0/1	1/0	—	—	1/0	—	—	1/0	—
<i>Onychomys arenicola</i>	—	—	—	—	—	—	—	1/1	—	—	—	—
<i>Onychomys leucogaster</i>	1/0	—	—	—	—	—	—	—	—	0/1	1/3	1/0
<i>Sigmodon hispidus</i>	—	—	0/3	2/0	—	0/4	—	—	—	3/3	—	—
<i>Neotoma albigena</i>	6/5	0/1	—	1/0	—	1/0	1/0	3/2	0/1	1/4	—	1/1
<i>Neotoma micropus</i>	—	2/0	—	—	—	—	—	—	—	—	—	—
TOTAL	13/7	5/4	6/10	12/4	4/6	8/11	8/16	8/5	7/11	6/9	3/6	7/5

Species	CL 13 M/F	CL 14 M/F	CL 15 M/F	CL 16 M/F	CL 17 M/F	CL 18 M/F	CL 19 M/F	CL 20 M/F	CL 21 M/F	CL 22 M/F	CL 23 M/F	CL 24 M/F	TOTAL M/F
<i>Spermophilus spilosoma</i>	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Perognathus flavescens</i>	—	—	0/1	4/2	0/1	—	—	—	—	—	—	—	—
<i>Chaetodipus eremicus</i>	—	—	—	—	—	1/4	—	—	1/3	—	2/2	0/1	15/21
<i>Chaetodipus hispidus</i>	—	—	—	—	—	—	—	3/0	—	—	—	—	10/12
<i>Chaetodipus intermedius</i>	1/0	—	—	—	2/2	—	—	—	—	—	—	—	—
<i>Dipodomys merriami</i>	2/5	0/1	—	—	1/1	1/0	1/0	0/1	4/1	2/2	3/2	—	18/25
<i>Dipodomys ordii</i>	—	—	—	—	—	—	—	—	—	—	—	0/2	27/35
<i>Dipodomys spectabilis</i>	—	—	—	—	—	—	—	—	—	—	—	—	5/5
<i>Reithrodontomys megalotis</i>	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Reithrodontomys montanus</i>	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Peromyscus eremicus</i>	—	—	—	—	—	—	—	—	—	—	—	—	—
<i>Peromyscus leucopus</i>	3/2	2/0	—	—	—	1/0	1/0	—	—	—	—	—	19/8
<i>Peromyscus maniculatus</i>	0/1	—	—	—	—	—	—	—	—	—	—	—	4/2
<i>Onychomys arenicola</i>	—	—	—	—	—	—	—	—	—	—	0/1	—	1/2
<i>Onychomys leucogaster</i>	—	1/1	—	—	—	—	—	—	—	—	—	—	5/5
<i>Sigmodon hispidus</i>	2/2	—	—	—	—	—	—	—	—	—	—	—	3/7
<i>Neotoma albigena</i>	1/0	1/0	—	—	—	—	—	—	1/1	—	—	—	17/20
<i>Neotoma micropus</i>	—	—	—	—	—	—	—	—	1/0	—	—	—	7/0
TOTAL	11/10	4/3	4/2	8/4	2/0	3/5	7/2	9/7	3/2	6/12	0/3	0/2	144/146

Neotoma albicula albicula

Hartley, 1894

White-throated Woodrat

One hundred and sixteen individuals of *Neotoma albicula* (52 males and 64 females) were obtained. This species was common in the nonstabilized dune (census line 1) and acacia hillside (census lines 9 and 16) habitats, and was captured in all four trapping periods. In contrast to all other species of rodents, this species, along with *Neotoma micropus*, increased in abundance during the final trapping season (autumn 1998) with 32% of the total captures of this species being recorded.

Neotoma micropus canescens

J.A. Allen, 1891

Southern Plains Woodrat

Thirty individuals of *Neotoma micropus* (18 males and 12 females) were obtained primarily from the sandy arroyo and creosote-tarbrush scrub habitats. In spring 1997, five males were obtained in sandy arroyo scrub (census line 6), *Chilopsis* arroyo (census line 8), creosote-tarbrush scrub (census line 14), and creosote grassland (census line 18) habitats, and six females were obtained in mixed desert scrub (census line 4), sandy arroyo scrub (census line 6), creosote grassland (census line 12), creosote-tarbrush scrub (census line 14), and acacia hillside (census line 16) habitats. In autumn 1997, two males were obtained in creosote grassland (census line 12) and creosote-tarbrush scrub (census line 14) habitats. In spring 1998, four males were obtained in a creosote grassland habitat (census line 12), and six females were obtained in nonstabilized dune (census line 2), mixed desert scrub (census line 4), creosote grassland (census line 12), and creosote-tarbrush scrub (census line 14) habitats. In autumn 1998, seven males were obtained in nonstabilized dune (census line 2), mixed desert scrub (census line 4), *Chilopsis* arroyo (census line 13), creosote-tarbrush scrub (census line 14), succulent hillside (census line 20), and mixed desert scrub (census line 22) habitats. This species, along with *N. albicula*, increased in abundance in autumn 1998.

Species Observed.—Many mammal species occurring on the Fort Bliss Military Base were not trappable with our experimental design and trapping methods. These species were recorded as observations and are presented below. These observations are not included with the data presented in Tables 2-6.

Sylvilagus audubonii goldmani

(Nelson, 1904)

Desert Cottontail

Individuals of *Sylvilagus auduboni* were observed from succulent hillside and mixed desert scrub habitats. This species was observed throughout the Fort Bliss Military Base on each census line and habitat type.

Lepus californicus texianus

Waterhouse, 1848

Black-tailed Jack Rabbit

Several individuals of this species were observed during each of the four collecting periods. This taxon typically occupied the more open grassland areas and roadsides.

Cynomys ludovicianus arizonensis

Mearns, 1890

Black-tailed Prairie Dog

Several individuals were observed in prairie dog towns located in the open grassland habitats on Otero Mesa.

Canis latrans texensis

Bailey, 1905

Coyote

Evidence of this species (tracks, scat, and dens) was noted throughout all habitats. Additionally, several individuals were observed along roadsides throughout the Fort Bliss Military Base.

Table 6.—Species diversity and number of males (*M*) and females (*F*) obtained from each census line (CL) sampled during all four trapping seasons.

Urocyon cinereoargenteus scottii
Mearns, 1891
Gray Fox

Two individuals were observed near census lines 6 and 7 (sandy arroyo scrub and succulent hillside). The secretive nature of this species created difficulty in estimating the abundance of this taxon.

Taxidea taxus berlandieri
Baird, 1858
American Badger

A single specimen was observed in spring 1997 near census line 8 (*Chilopsis* arroyo). In addition, many excavations of rodent burrows were noted and may indicate that badgers are common.

Lynx rufus baileyi
Merriam, 1890
Bobcat

Three individuals were observed during the first two seasons (spring and autumn 1997) within the riparian habitats below Otero Mesa.

Odocoileus hemionus crooki
(Mearns, 1897)
Mule Deer

This species was observed throughout most areas of Fort Bliss with the exception of open grasslands. Most were noted in the early morning near brushy foothills of Otero Mesa.

Antilocapra americana americana
(Ord, 1815)
Pronghorn

This species was quite common in the grama and yucca grasslands located on Otero Mesa.

Although little is known about the relative abundance of this species, on one occasion, at least 70 individuals were observed at a single site.

Oryx gazella
(Linnaeus, 1758)
Gemsbok

This introduced species was observed in small groups (2-5 individuals) on numerous occasions in the swale and nonstabilized dune habitats near the Sacramento Mountains.

Ammotragus lervia
(Pallas, 1977)
Barbary Sheep or Aoudad

A single individual of this introduced species was observed on the rocky slopes just below Otero Mesa.

ACKNOWLEDGEMENTS

The authors would like to thank the personnel at Fort Bliss Military Base (Kelly Fischer, Shane Offut, Will Roach, and Keith Landreth) as well as the Davis Dome staff for assistance during this project. We would also like to thank the New Mexico Department of Game and Fish for issuing a scientific collecting permit (# 2865). We also thank Darin Carroll, Kristina Halcomb, Roslyn Martinez, Cole Matson, Anton Nekrutenko, Mark O'Neill, Calvin Porter, Heather Rob-

erts, Brenda Rogers, and Jeff Wickliffe for assistance in collection and preparation of specimens. Jody Martin and Nick Parker of the Texas Cooperative Fish and Wildlife Research Unit, Texas Tech University provided important administrative support during this study. Funding for this project was provided by a Department of Defense grant (MIPR W52EU251606913) through William Whitworth at USACERL.

LITERATURE CITED

- Animal Care and Use Committee. 1998. Guidelines for the capture, handling, and care of mammals as approved by the American Society of Mammalogists. *J. Mamm.*, 79: 1416-1431.
- Davis, W.B., and D.J. Schmidly. 1994. The Mammals of Texas. Texas Parks and Wildlife Department, Austin, x + 388 pp.
- Findley, J.S., A.H. Harris, D.E. Wilson, and C. Jones. 1975. Mammals of New Mexico. University of New Mexico Press, Albuquerque, x + 360 pp.
- Findley, J.S. 1987. The Natural History of New Mexican Mammals. University of New Mexico Press, Albuquerque, x + 150 pp.
- Gardner, J. L. 1951. Vegetation of the Creosotebush area of the Rio Grande valley in New Mexico. *Ecol. Mono.*, 21:379-403.
- Jones, C., R.S. Hoffman, D.W. Rice, M.D. Engstrom, R.D. Bradley, D.J. Schmidly, C.A. Jones, and R.J. Baker. 1997. Revised Checklist of North American Mammals North of Mexico. *Occas. Pap. Mus.*, Texas Tech Univ., 173:1-18.
- Jorgensen, E.E. 1996. Small mammal and herpetofauna communities and habitat associations in foothills of the Chihuahuan Desert. Unpublished Ph.D. dissertation, Texas Tech Univ., Lubbock.
- Longmire, J. L., M. Maltbie, and R. J. Baker. 1997. Use of "lysis buffer" in DNA isolation and its implication for museum collections. *Occas. Pap. Mus.*, Texas Tech Univ., 163:1-3.
- Monasmith, T.J. 1997. Fire effects on small mammals and vegetation of the northern Chihuahuan Desert. Unpublished Masters thesis, Texas Tech University, Lubbock.
- O'Farrell, M.J., D.W. Kaufman, D.W. Lundahl. 1977. Use of Live-trapping with the Assessment Line Method for Density Estimation. *J. Mamm.*, 58:575-582.
- Schmidt, R.H. 1986. Chihuahuan climate. Pp. 40-63, in Second symposium on resources of the Chihuahuan Desert region. (J.C. Barlow, A.M. Powell, B.N. Timmermann, eds.). Chihuahuan Desert Institution.
- Shreve, F. 1942. The desert vegetation of North America. *The Botanical Review*, 8:195-246.

Addresses of authors:

MELINDA L. CLARY

*Department of Biological Sciences
Texas Tech University
Lubbock, TX 79409-3131
e-mail: mclary@ttacs.ttu.edu*

STACY J. MANTOOTH

*Department of Biological Sciences
Texas Tech University
Lubbock, TX 79409-3131
e-mail: stacy.mantooth@ttu.edu*

DARIN M. BELL

*Department of Biological Sciences
Texas Tech University
Lubbock, TX 79409-3131
e-mail: dbell@ttu.edu*

LOTTIE L. PEPPERS

*Department of Biological Sciences
Texas Tech University
Lubbock, TX 79409-3131
llpeppers@hotmail.com*

CODY W. EDWARDS

*Department of Biological Sciences
Texas Tech University
Lubbock, TX 79409-3131
e-mail: cedwards@ttu.edu*

IRENE TIEMANN-BOEGE

*Department of Biological Sciences
Texas Tech University
Lubbock, TX 79409-3131
e-mail: izitb@ttacs.ttu.edu*

TED W. JOLLEY

*Department of Biological Sciences
Texas Tech University
Lubbock, TX 79409-3131
e-mail: tedjolley@hotmail.com*

FRANK D. YANCEY, II

*Earth Tech, Inc.
1461 E. Cooley Dr., Suite 100
Colton, CA 92324
e-mail: fyancey@earthtech.com*

OLEKSIY KNYAZHNITSKIY

*Department of Biological Sciences
Texas Tech University
Lubbock, TX 79409-3131
e-mail: alexey@packrat.musm.ttu.edu*

DONNA J. HOWELL

*Santa Ana National Wildlife Refuge
R2, Box 202A
Alamo, TX 78516
e-mail: donna_howell@fws.gov*

NICOLE LEWIS-ORITT

*Department of Biological Sciences
Texas Tech University
Lubbock, TX 79409-3131
e-mail: nlewisor@ttu.edu*

BRIAN A. LOCKE

*Senior Wildlife Ecologist
Directorate of Environment
Fort Bliss, TX 79916-6812
e-mail: lockeb@emh10.bliss.army.mil*

ROBERT J. BAKER

*Department of Biological Sciences
and the Museum
Texas Tech University
Lubbock, TX 79409-3131
e-mail: bjrdb@ttacs.ttu.edu*

ROBERT D. BRADLEY

*Department of Biological Sciences
and the Museum
Texas Tech University
Lubbock, TX 79409-3131
e-mail: izrdb@ttacs.ttu.edu*

PUBLICATIONS OF THE MUSEUM OF TEXAS TECH UNIVERSITY

It was through the efforts of Horn Professor J Knox Jones, as director of Academic Publications, that Texas Tech University initiated several publication series including the Occasional Papers of the Museum. This and future editions in the series are a memorial to his dedication to excellence in academic publications. Professor Jones enjoyed editing scientific publications and served the scientific community as an editor for the Journal of Mammalogy, Evolution, The Texas Journal of Science, Occasional Papers of the Museum, and Special Publications of the Museum. It is with special fondness that we remember Dr. J Knox Jones.

Institutional subscriptions are available through the Museum of Texas Tech University, attn. NSRL Publications Secretary, Box 43191, Lubbock, TX 79409-3191. Individuals may also purchase separate numbers of the Occasional Papers directly from the Museum of Texas Tech University.

This study was made possible by support from the United States Department of Defense.

Layout and Design: Jackie Chavez
Cover Design: Eric Schultz and Richard Monk

Copyright 1999, Museum of Texas Tech University

All rights reserved. No portion of this work may be reproduced in any form or by any means, including electronic storage and retrieval systems, except by explicit, prior written permission of the publisher.

This book was set in Times New Roman and printed on acid-free paper that meets the guidelines for permanence and durability of the Committee on Production Guidelines for Book Longevity of the Council on Library Resources.

Printed: 15 July 1999

Library of Congress Cataloging-in-Publication Data

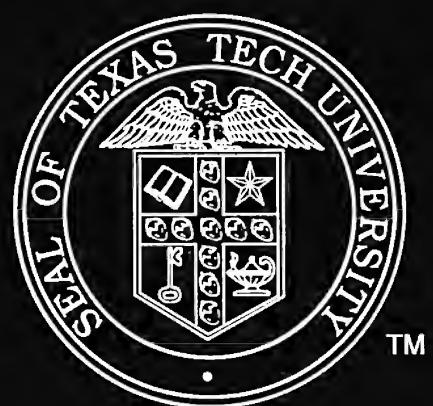
Occasional Papers, Number 192
Series Editor: Robert J. Baker

CHECKLIST OF MAMMALS FROM TWELVE HABITAT TYPES AT FORT BLISS MILITARY BASE; 1997-1998

By: Melinda L. Clary, Darin M. Bell, Cody W. Edwards, Ted W. Jolley, Oleksiy Knyazhnitskiy, Nicole Lewis-Oritt, Stacy J. Mantooth, Lottie L. Peppers, Irene Tiemann-Boege, Frank D. Yancey, II, Donna J. Howell, Brian A. Locke, Robert J. Baker, and Robert D. Bradley

ISSN 0149-175X

Museum of Texas Tech University
Lubbock, TX 79409-3191 USA
(806)742-2442



TM

